# Space Weather Forecast

Issued on Monday 9 December 2024 at 00:43 Local

**This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: Moderate-class flares likely with a slight chance of isolated Strong Flares and Solar Radiation storms.**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** High activity with a Strong flare at 08/0906 UTC from a region in the southwest. There are currently eight sunspot regions on the disc. A region in the southeast may be the most magnetically complex, although this is uncertain due to the lack of high resolution imagery. The region responsible for the Strong flare also has potential magnetic complexity, although again this is uncertain, particularly as it is starting its approach towards the limb. A further region nearing south centre disc appears fairly small and straightforward, but another region which has developed nearby, whilst small, appears to have a slightly complex magnetic layout. There are three regions all in close proximity to each other, increasing the likelihood of interaction between them. Other regions appear small and simple at the present time.

Following on from the Strong flare on the 08 Dec, analysis suggests that the resulting Coronal Mass Ejection (CME) is likely to pass ahead of Earth's orbit, with no or limited impacts at Earth. No other Earth directed CMEs were seen in the last 24 hours.

**Solar Wind / Geomagnetic Activity:** Solar winds showed signs of a weak coronal hole fast wind. Wind speeds increased from background levels, around 370 km/s, to slightly elevated near 440 km/s. The Interplanetary Magnetic Field (Bt) has been largely moderate, with the north-south component fluctuating weakly for much of the period, becoming moderately variable after 08/2300 UTC. Quiet geomagnetic activity throughout.

**Energetic Particles / Solar Radiation:** No solar radiation storms were observed.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Further Moderate-class flares are likely, with a slight chance of isolated Strong flares, this risk decreasing slightly after the region responsible for the recent Strong flare rotates off the disc.

**Solar Wind / Geomagnetic Activity:** No Earth directed CMEs are currently expected. Wind speeds are likely to be slightly elevated for much of this period, due to a weak fast wind from a coronal hole. Geomagnetic activity is expected to be subdued, however.

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As a result, Quiet to Unsettled geomagnetic conditions are expected with a slight chance of Active intervals.

**Energetic Particles / Solar Radiation:** There is a slight chance of solar radiation rising above the S1/Minor Radiation Storm threshold, mainly due to the region which produced the Strong flare on the 08 Dec.

## Geomagnetic Storms

| Geomagnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| **Minor or Moderate** | **G1 to G2** | No | 1 | 1 | 1 | 1 |
| **Strong** | **G3** | No | 1 | 1 | 1 | 1 |
| **Severe** | **G4** | No | 1 | 1 | 1 | 1 |
| **Extreme** | **G5** | No | 1 | 1 | 1 | 1 |

## Radio Blackouts - X-Ray Flares

| X-Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| **Active** | **R1-R2 (M Class)** | Yes | 60 | 60 | 60 | 50 |
| **Very Active** | **R3-R5 (X Class)** | Yes | 10 | 10 | 10 | 5 |

## Solar Radiation Storms (High Energy Protons)

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}sr^{-1}s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| **Active** | **≥ S1** | No | 10 | 10 | 10 | 10 |
| **Very Active** | **≥ S3 *** | No | 1 | 1 | 1 | 1 |
| * S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$) | | | | | | |

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